A PRELIMINARY REPORT ON THE YOUNG STRIPED MULLET (*MUGIL CEPHALUS* Linnaeus) IN TWO GULF COASTAL AREAS OF FLORIDA[1]

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The common striped mullet of commerce in Florida forms the base for a multimillion dollar fishing industry. Anderson and Power (1948: 165) fix the value of the 1940 catch at $1,188,185.00. This sum represents more than one-third of the value of all Florida fish taken during that year. The next most important species listed is the red snapper, which had a value of less than one-third that of the mullet. Besides supplying thousands of tons of food for man and being a favorite bait fish, the mullet is also an important food for many of the game and commercial fishes of the state. Jordan and Everman (1908: 253) present an interesting account of the economic importance of the mullet to Florida.

In view of its commercial value and the universally admitted desirability of its conservation and perpetuation as a natural resource of the state, it might be assumed that the life history of the mullet is well known. Such an assumption, however, would be in error, because little has been published on the young, and specimens less than 16 mm. in standard length are apparently unknown. A detailed study by Gunter (1945) on the behavior of mullet along the Texas coast summarizes the observations of Hildebrand and Schroeder (1928), Higgins (1927), and Breder (1940). Jacot (1920) reports on the growth and characters, particularly scale development, of *M. cephalus* and *M. curema* collected in North Carolina. Gunter (*op. cit.*: 51–2) states that:

> Young first appeared in the minnow seine catches in December, 1941, on the Gulf beach and in lower Aransas Bay. In 1942 they were first taken on the Gulf beach in November. They were 24 to 25 mm. long.[2] In January, 1941, they appeared in huge numbers and had by that time spread into Copano Bay. These small mullet continued in minnow seine catches in large numbers until March. They grew rapidly. A few were caught in April. Some of the small fish, especially in the later months, may have been *Mugil curema*

[1] Contribution from the Department of Biology, University of Florida.

[2] Length expressed as the distance from tip of snout to tip of longest caudal ray. A 25 mm. specimen on this basis has a standard length of approximately 20 mm.

for the young of the two species are difficult to separate in the field.[3] In June, 1941, the largest of the young were 33 to 103 mm. long. In November, the small mullet, in all likelihood the same group, ranged from 103 to 148 mm. long. They were then about one year old.

In summary, the large mullet go to the Gulf in the fall and congregate near the passes on the outside beaches. Spawning takes place there and extends from late October to early January, with the peak probably falling in late November and early December. Young mullet first appear on the Gulf beach and the lower bay in November and December and soon spread all over the shallow areas of the bays. They were taken most abundantly in January. After spawning the large mullet scatter out again and large numbers of them return to the bays.

This rather simple picture of mullet spawning and movements of the old and young observed here is essentially the same as that reported in Florida by Captain J. L. Sweat (Hildebrand and Schroeder, 1928). It also corresponds with observations of Higgins (1927) and scattered observations of other workers throughout the years. Schroeder (see Hildebrand and Schroeder, *op. cit.*) says mullet spawn in Florida in November and December. Hildebrand and Schroeder (*op. cit.*) said that the mullet did not spawn in Chesapeake Bay, but that spawning could not have been far away, for small fry came into the bay in April. Breder (1940) observed mullet spawning in inside waters in Florida in February. He did not mention the salinity, but in all probability it was quite high.

This summary indicates the small amount of available specific information on which to base a sound, long term program of conservation for Florida mullet. The principal measures in practice at present consist of a closed season between December 10th of one year and January 20th of the next, and regulations governing the gear used in fishing operations.

During the period from June, 1947, through December, 1948, the writer made a series of fish collections in the Gulf coastal marshes along the northern third of the Florida peninsula in the vicinities of Cedar Key and Bayport. These localities are some 100 miles and 50 miles north of Tampa Bay, respectively. Approximately one hundred and eighty collections were made and, of these, sixty contained mullet. The 2,024 specimens of young mullet from the Cedar Key area and the 210 from the Bayport area range in size from 16 mm. to 103 mm. standard length measurement. This material and the data assembled on the habits and habitats of the mullet afford information which may be of interest to both the fisheries conservationist and the ichthyologist.

The collections resulting in the mullet catches are part of a study primarily designed to discover which fishes, and to what extent these fishes, occur in the Gulf coastal marshes as represented by the Cedar

[3] Some of the specimens in the present study may have been young of *Mugil curema* but, if so, preserved Florida specimens of the two species are extremely similar—more, perhaps, than Jacot (*op. cit.*) describes for North Carolina representatives.

Key and Bayport areas. A secondary aim is to investigate the role which salinity plays in the distribution of these marsh fishes. It is planned to report on these studies at a later date. The present paper is concerned with a limited amount of the data assembled on the mullet.

Areas Studied

Collections were made in, and adjacent to, the zone commonly referred to as salt or coastal marshes bordering the Gulf of Mexico. In addition, exploratory, but not intensive, collecting was done in the shallower waters of the open bays and in fresh water close to the margins of the marshes.

The Cedar Key and Bayport marshes are fairly representative of many thousands of square miles of coastal marsh occurring on both the Atlantic and Gulf shores of Florida. Such areas are particularly extensive near estuaries and in the vicinities of the larger bays and sounds. They constitute a very definite zone separating the open waters from the lands above high tide mark. Along the Gulf Coast, marshes are absent in some localities where the beach is adjacent to high land, but in most areas they are present and may reach a width of several miles.

Typically, the marshes are dissected by watercourses which empty into the bays and sounds. Between these watercourses are, usually, some areas of open water which frequently have soft, muddy bottoms. Some of the smaller open areas were found to contain young mullet; these situations are described in detail later.

The dominant, emergent vegetation of the marshes at Cedar Key and Bayport is *Juncus romerianus* and *Spartina alterniflora*, with the latter pioneering almost to extreme low tide level and occupying, in general, the areas barely covered by water at normal low tides. *Juncus romerianus* tends to favor slightly higher situations which are inundated only at high tide. Mangrove islands are not uncommon and usually are established along shorelines and on the more elevated oyster bars.

The maze of watercourses interconnects all parts of the marshes. Flooding of the entire marsh at high tide covers the whole area with one vast sheet of water. At such times fish may pass freely through the stands of emergent plants which are only partially covered by the water at normal high tide. Field observations indicate that the fishes inhabiting the marshes penetrate the vegetated areas at all times that water covers them. As the water recedes the fish are consequently re-

stricted more and more, and on extremely low tides are confined to the deeper holes in the bayous, along the shores of the bays, and especially in the small tide pools of the marshes themselves. It is at such times of concentration that effective seining is possible. During periods of high tides the fishes readily escape the net by taking refuge in vegetated areas where it is impossible to catch them in numbers. Consequently, most of the collecting of the present study was accomplished at low tide.

Methods

The most frequently used net was a minnow seine of one-quarter inch mesh, ten feet long, four feet deep, and equipped with a four foot bag in the center. A similar net twenty-five feet long was used in bodies of water too large to be spanned by the shorter net. Supplementing these two seines were tea strainers, D-type dip nets with fine mesh, and "Common Sense" seines of approximately one-eighth inch mesh.

Whenever possible, the seine hauls were planned so that the body of water being worked was covered by the net from shore to shore, and seine hauls were repeated until it was believed that all, or at least nearly all, species of fish present were represented in the collection. Care was exercised to keep the lead line either on or below the bottom and the cork line floating or even raised above the surface of the water. The seining through the soft, bottom mud netted many fish which would otherwise have escaped due to the habit of a number of species of burying themselves in the mud when disturbed. Mullet, for example, were caught by hand in crab holes approximately eighteen inches below the mud surface.

Preservation of specimens was accomplished by placing the catch in ten percent formalin. All specimens caught were preserved except when the haul netted very large numbers of individuals. Then from one to six quarts of the fish were preserved by simply scooping them into the preservative with no attempt to select specimens on the basis of size or species. A card bearing the identifying name[4] of the station and a field catalogue number was placed in the container with the specimens. The same number was then entered on a field catalogue card on which was recorded data principally as follows: location and description of station; water conditions including depth, temperature, density,

[4] Names for stations were employed in the field. Later each station was designated by a number and this simplified the handling of data, *cf.* Figs. 1 and 2.

turbidity, and color; tide conditions; time of day; and collecting methods.

Salinities were calculated in the laboratory from data collected in the field. A sample of the water of the station was taken within three or four inches of the surface as a consistent practice, because so often it was necessary to take the sample there due to the shallowness of the water at many of the stations. Within minutes of taking the water sample, its temperature was recorded from a centigrade thermometer and the density determined by the use of a sea-water hydrometer graduated in thousandths. The temperature and hydrometer readings were taken simultaneously and used to establish the salinity of the sample substantially in accordance with the specific gravity method employed by the U.S. Coast and Geodetic Survey and described by Schureman (1941: 81–5).

Acknowledgments

The field and laboratory work, as well as the organization and writing of this report on a part of it, has been made a pleasure by the unreserved assistance rendered the writer by nearly every member of the Department of Biology at the University of Florida. Staff members and students have been of material assistance by their contributions in seining operations, planning and organizing the field work, and the accumulation and interpretation of data and criticism of the manuscript. The list is too long to allow the specific listing of these aids by individuals. However, at this limited opportunity, particular thanks are extended to the members of the writer's Graduate Committee for their assistances which extended far beyond the call of duty; to Miss Esther Coogle whose skill was painstakingly employed in the production of the plate and text figures; to the Board of Conservation and to the Game and Fresh Water Fish Commission of Florida for necessary collecting permits; and to Dr. Adrian C. Coogler and family who made the work at Bayport possible by generously furnishing quarters, boats, and motors for use there.

Habitats

The young mullet were obtained almost exclusively from two rather distinct habitats. Small specimens (16 mm.–27 mm., but chiefly 17 mm.–19 mm.) were caught within feet, and usually within inches, of the water line of the open Gulf beaches having either sand or mud bottoms. These beach mullet were in definite groups of from five to about fifty

individuals, and showed well developed schooling behavior. On one occasion during low tide (November 8, 1947), a dozen schools were watched over a period of several hours. All the schools kept close inshore and none could be found in nearby deeper water, although much searching was done for them. When undisturbed the fish appeared to be following the shore, and since they kept so close to the water's edge it appeared almost certain that the next high tide would lead them into the marshes beyond.

Small (17 mm.), as well as larger specimens (up to 103 mm.), were found in mud-bottomed, shallow tide pools of the marshes themselves. The proximity of the pool to the open Gulf varied from a few yards to several miles. The pools which produced maximum catches were invariably small pockets from approximately six feet wide to about thirty-five feet wide. All of these pools had ooze-mud bottoms into which a seiner would sink from slightly less than a foot to as much as three feet in some softer spots. At low tide the depth of the water in those pools having a direct outlet to bayous or other marsh watercourses would be reduced to as little as three inches in the deeper parts; other pools with no direct connection to lower levels would retain up to two feet of water even during extremely low tides. Around the edges of the pools dense growths of *Spartina alterniflora*, and occasionally some *Juncus romerianus*, were present and, when partially inundated by high tide, provided a well protected refuge and, quite possibly, feeding area for the pool fishes.

Temperatures and salinities of the marsh waters fluctuate widely and vary from pool to pool. This is to be expected in such shallow waters where the effects of tidal action, precipitation, evaporation, radiation, and other factors would soon be noticeable. The extent of these changes is indicated by data recorded as each collection was concluded.

Thus, as expected, the salinities vary widely from station to station and from month to month. Fig. 1 shows graphically the salinities of stations at which mullet were taken. The lowest reading is 1.1 ‰ (part per thousand) taken in a marsh pool (station 3) in the Bayport area on March 20, 1948. This same pool showed a salinity of 24.7 ‰ on May 22 of the same year. The difference between these extremes was equaled at a beach station (Cedar Key No. 3) where the salinity ranged from 6.2 ‰ in November, 1947, to 29.8 ‰ in December, 1948. A reading of 35.6 ‰ on May 16, 1948, at Cedar Key constituted the highest recorded during the study at a time mullet were found to be

present. This record was made at station 7, a small, shallow pool near the mainland edge of the marsh.

Temperatures show a similar fluctuation as is indicated by Fig. 2, but here seasonal changes are more in evidence. The low recorded for a time and place that mullet were taken was 13°C. at Cedar Key (station 5) on November 29, 1947. The high, also at Cedar Key, was 34.5°C. recorded at two stations, Nos. 1 and 5, on June 27, 1948, and at station No. 1 on October 20, 1947. The greatest range of temperature for a station containing mullet (Cedar Key No. 5) extends from the low of 13°C. in November, 1947, to the high of 34.5°C. in June, 1948. This pool is approximately six feet in diameter at normal low tide and receives ebb tide water from approximately one-half acre of open or sparsely vegetated mud flat nearby, where water depths are measurable only in inches at normal high tide and do not exist at low tide. The relatively few readings made (59 each for temperature and salinity) certainly do not represent the true extremes of either factor in the area;

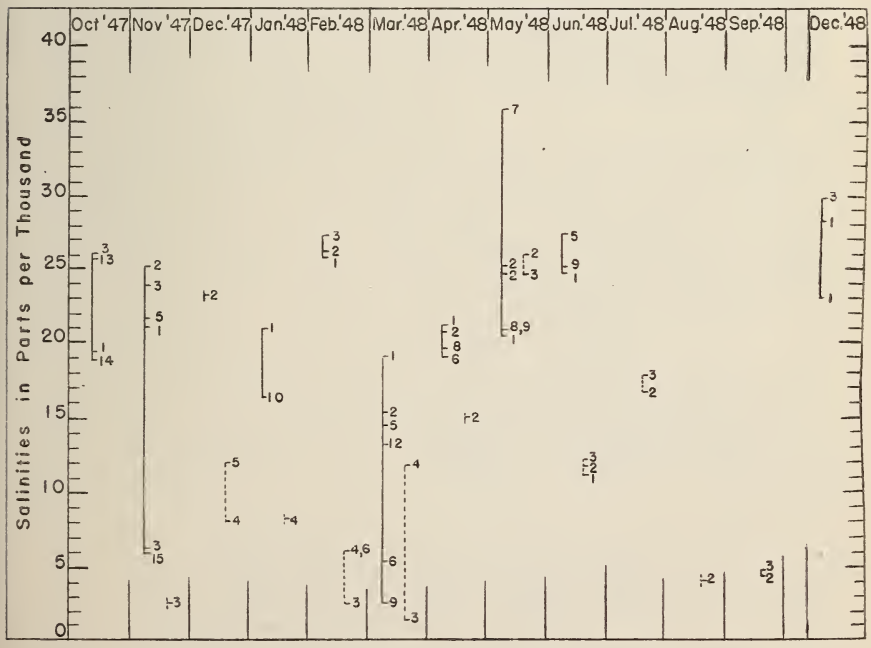

Fig. 1. Salinities for stations at Cedar Key (solid lines) and Bayport (broken lines). Points on the bars show salinities recorded; numbers opposite the points identify the stations. Only data for stations having mullet at the times indicated are included.

however, they do indicate that a wide range of both are tolerated by young mullet.

Comparison of Habitats at Cedar Key and Bayport

The habitats of the young mullet are very similar in the two areas studied, but some observable differences exist among the stations most frequently seined. The marshes of the Cedar Key area border, in general, a much ramified, shallow, mud-bottomed bay abounding in oyster bars. The shallower parts of the bay are exposed at normal low tide, and, on those occasions when winds combine with lunar effects to drive the tide level to extreme low, little open water exists except in the deeper channels and a limited number of pools. No sizeable streams empty into the bay, although the mouths of several small creeks are to be found.

The Bayport marshes are much less extensive than those of Cedar Key, and receive the output of two rivers, the Mud and the Weeki-

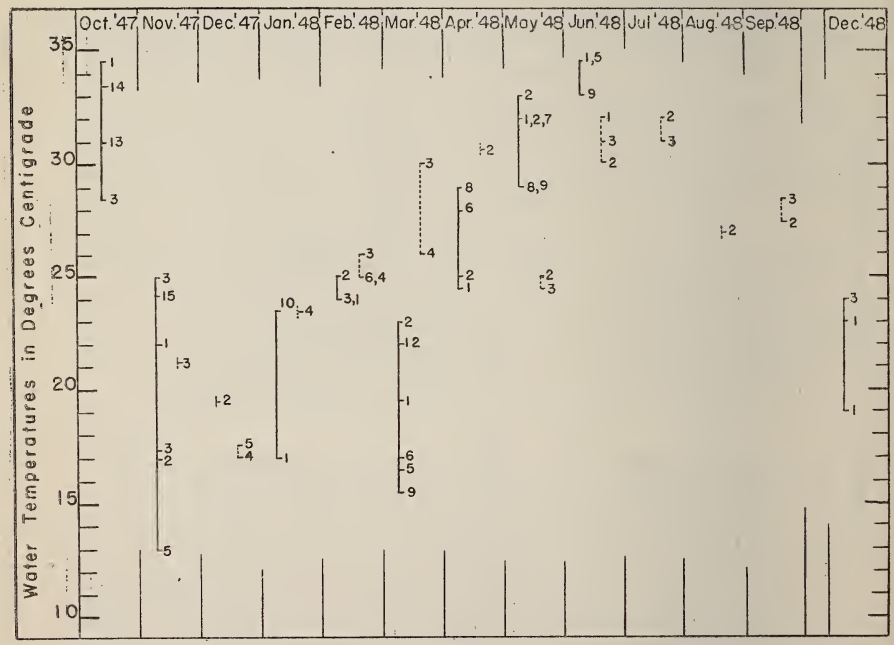

Fig. 2. Water temperatures (°C.) for stations at Cedar Key (solid lines) and Bayport (broken lines). Points on the bars indicate the temperatures recorded; numbers opposite the points identify the stations. Only the data for stations having mullet at the times indicated are included.

watchee. Both streams are of spring origin and receive some contribution from runoff along their courses. The faintly brackish water from both rivers tends to reduce salinities in the marshes of the bay and also, because of the relatively constant temperature of the springs, partially stabilizes the temperature of the diluted water.

In addition, the collection stations at Bayport producing the bulk of the mullet caught there were slightly deeper than those of the Cedar Key area. Natural obstructions formed by the banks of the pools at Bayport prevented serious loss of water during extremely low tides. Thus the fairly constant water levels, plus the moderated temperatures of high tide water flowing into the pools, probably tended to reduce the range of the temperatures recorded. These temperature differences are shown graphically in Fig. 2.

Description of Young

Plate 1 illustrates, at about life size, specimens in formalin of young mullet of standard lengths (*a*) 17 mm., (*b*) 39 mm., (*c*) 63 mm., and (*d*) 82 mm. The drawing of the largest specimen shows detail; the other three show only the general body shape and the pigmentation pattern visible in preserved specimens. The eye is drawn more as it appears in life for the sake of clarity.

Living individuals are of a brilliant silver ventrally and laterally and show no pattern on the sides. Dorsolaterally the silver becomes progressively duller until the color reaches a dusky tan on the dorsal surfaces of the head and body. All surfaces are irridescent and show flashes of pale, whitish blue as the light strikes the fish from different angles. A conspicuous irridescent spot is usually present between the eyes of individuals of about 40 mm. or less in length.

Atop the head on the mid-dorsal line at a point between the posterior margins of the eyes, a conspicuous orange-red spot is present in individuals up to about 35 mm. in length. In larger specimens the spot tends to become whitish, and in the largest specimens it is not discernible.

The golden pigmentation of the iris and the blue spot at the base of the pectorals described for Texas specimens by Gunter (1945: 52) are not evident in the specimens from either Cedar Key or Bayport. These differences warrant further study.

The pupil is jet black and is surrounded by a silver-white iris. Adjacent tissues are silver and mask the remaining eye tissues except on very small specimens, which are sufficiently translucent to permit the

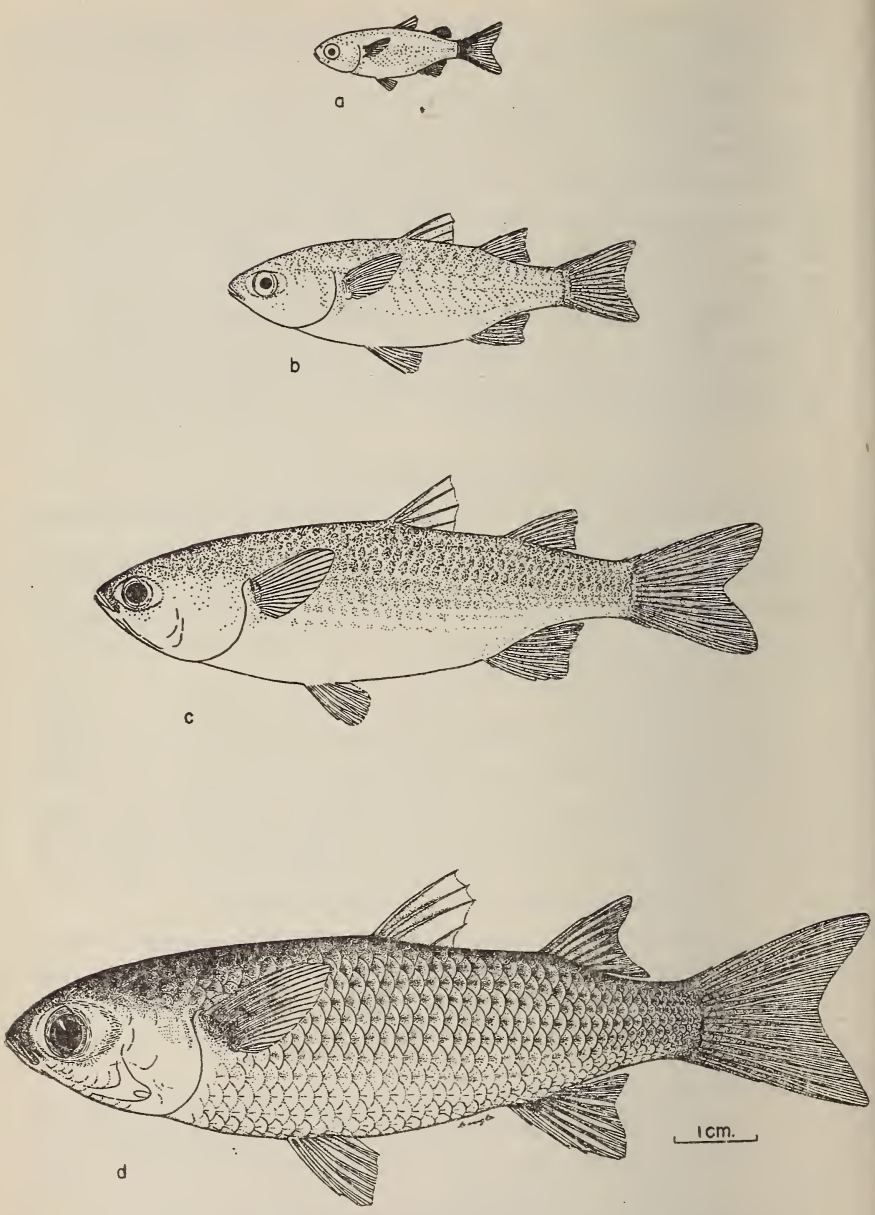

Plate 1. Fig. *a*, *b*, *c*, *d*. *Mugil cephalus* showing general body shape and development. Standard lengths: (*a*) 17 mm., (*b*) 40 mm., (*c*) 63 mm., (*d*) 82 mm. First three figures show pigmentation of preserved specimens—scales have been omitted. Fig. *d* shows both scales and pigmentation of preserved specimen.

outline of the whole eye to be seen. The adipose eyelid develops as described by Jacot (1920: 205–6).

In formalin the silvery coloration rapidly fades, and in a few days the fish are dull and dusky. Heaviest pigmentation is on the dorsal surface as illustrated by the drawings in Plate 1. Specimens less than about 40 mm. standard length rarely show even a hint of the striped condition of the adult, but as the size increases from 40 mm. the stripes become more evident. Specimens of 60 mm. are well striped as indicated by the two larger specimens represented on Plate 1.

The scales are in full evidence and appear well developed on the smallest (16 mm.) specimens examined. Their development is described and illustrated by Jacot (*op. cit.*).

Growth and Development of Young Mullet

Figs. 3 and 4 show, by months, the range in the standard lengths of young mullet collected at Cedar Key and at Bayport respectively during the period May 11, 1947–December 19, 1948. The range of the lengths of the specimens is indicated by dark, radial lines placed at the approximate dates of the collections made during the year October, 1947, to October, 1948; the hollow bars represent all other collections. Table 1 lists all young mullet collected at both areas by standard lengths and dates of collection.

Cedar Key: The largest specimens (Table 1 and Figure 3) in the October and November collections from Cedar Key probably represent individuals of the 1946–47 spawning and are presumably eight months to a year old. Very small specimens are apparently present from late October to the middle of May and indicate an extended breeding season of about that duration, but starting as much earlier as it takes a fertilized egg to develop into a 16 mm. fish. The season is probably from early October to early May if this year is at all typical of the normal situation.

Although regular collections were conducted at Cedar Key stations which had contained mullet in the preceding months, none was found during July, August, and September of 1948. Apparently the young mullet had sought deeper water, possibly of the bays, and this movement was anticipated by what appeared in the data as an abnormal reduction in the expected number of fish more than 70 mm. in length. It is thought that as the fish reach sizes from about 60 mm. to 100 mm. they move to deeper water, and that during July all fish remaining

in the marsh pools move to the bays regardless of their size. Relatively high water temperatures may constitute the principal cause of the July exodus from the marshes. If this is the case, the critical point may be between 30°C.–35°C. The range of temperatures for the period under consideration is graphically represented in Fig. 2.

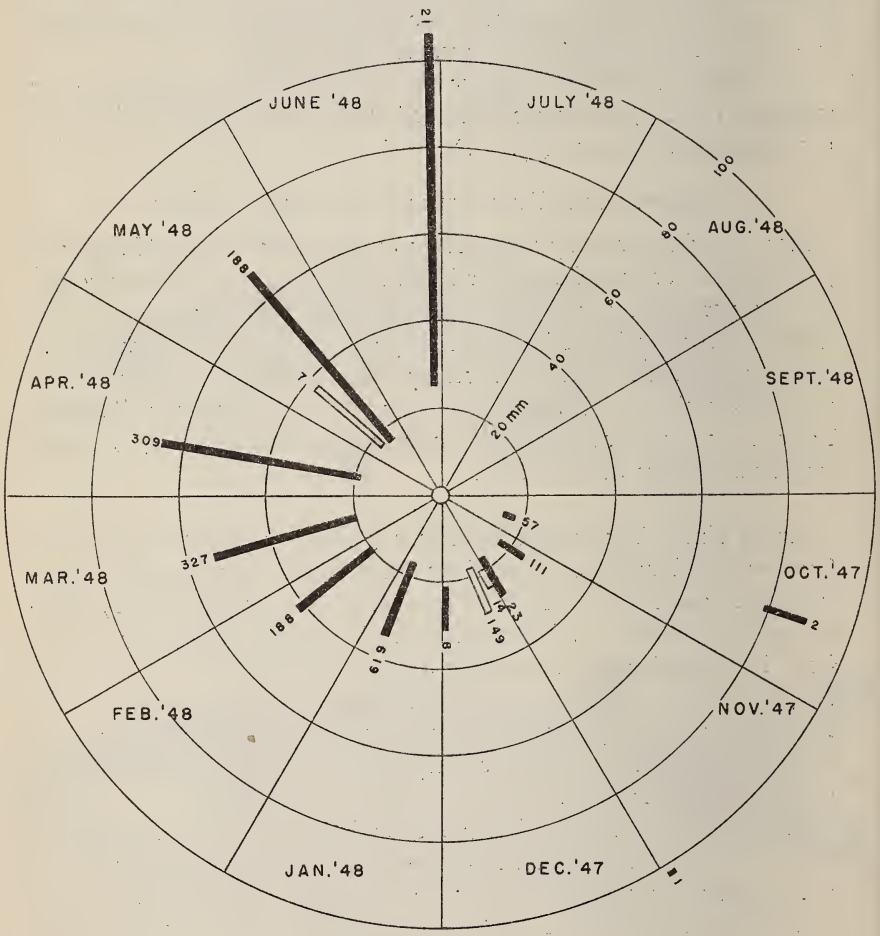

Fig. 3. Number and size range of young mullet collected from the Cedar Key area October, 1947–September, 1948, represented by dark, radial bars (hollow bars are shown for May, 1947, and December, 1948, collections). Numbers at ends of bars show sizes of samples.

Bayport: Fig. 4 and Table 1 show that at Bayport young mullet were collected during all months of the year except October. The large specimen of 83 mm. taken in November, 1947, probably represents a stray individual from the 1946–47 spawning. The presence of specimens 21 mm. or less in length in only the month of October may indicate a shorter spawning season than the one at Cedar Key where such specimens were collected over a period of eight months beginning in October, 1947. However, the number of specimens collected at Bayport is insufficient to be conclusive.

The presence of specimens in July, August, and September collections at Bayport constitutes another point of interest when compared with Cedar Key collections and lends support to the assumption that temperature may determine, in part at least, the length of stay of young mullet in marsh pools. As previously mentioned under the discussion of temperature, Bayport mullet were taken in pools which did not show as high temperatures as those at Cedar Key (Fig. 2.)

Growth Rate: Allowing for the differences in the size of samples and the actual dates of collection in a given month, the growth rate of young mullet appears to be approximately equal for the Bayport and Cedar Key areas. Assuming that the larger specimens collected in succeeding months represent the larger specimens of preceding months, it appears that a given specimen of 18 mm. in October may reach approximately 27 mm. by late November, 35 mm. by the latter half of January, 54 mm. by mid-March, and 65 mm. by mid-April. Data for larger specimens is even less sufficient, and therefore does not warrant further projection of the growth rate. However, comparison with the monthly size ranges given by Gunter (*op. cit.*: 51) suggests a close similarity between growth of Florida and Texas specimens.

Conservation Recommendations

Although the data here clearly indicate the need for additional study of the mullet in Florida waters, two facts seem sufficiently well established to be useful in conservation practices or research programs:

1. The very young mullet make extensive use of the small, mud-bottomed pools in the Gulf coastal marshes. Continued reduction in the number of these habitats by the constructions of man may have a marked effect on the survival of the young mullet. On the other hand, an increase in the number of such pools by artificial means may

offset the loss so evident in and around many of Florida's coastal towns and cities.

Pools similar to those which contained the majority of the specimens collected during the present study should be relatively easy to create in suitable marsh areas. It is believed that explosives could be used to advantage in approximately the same manner presently employed in blasting ditches through marsh areas. A few sticks of dynamite placed at a depth of about two feet in the soft mud of the marsh,

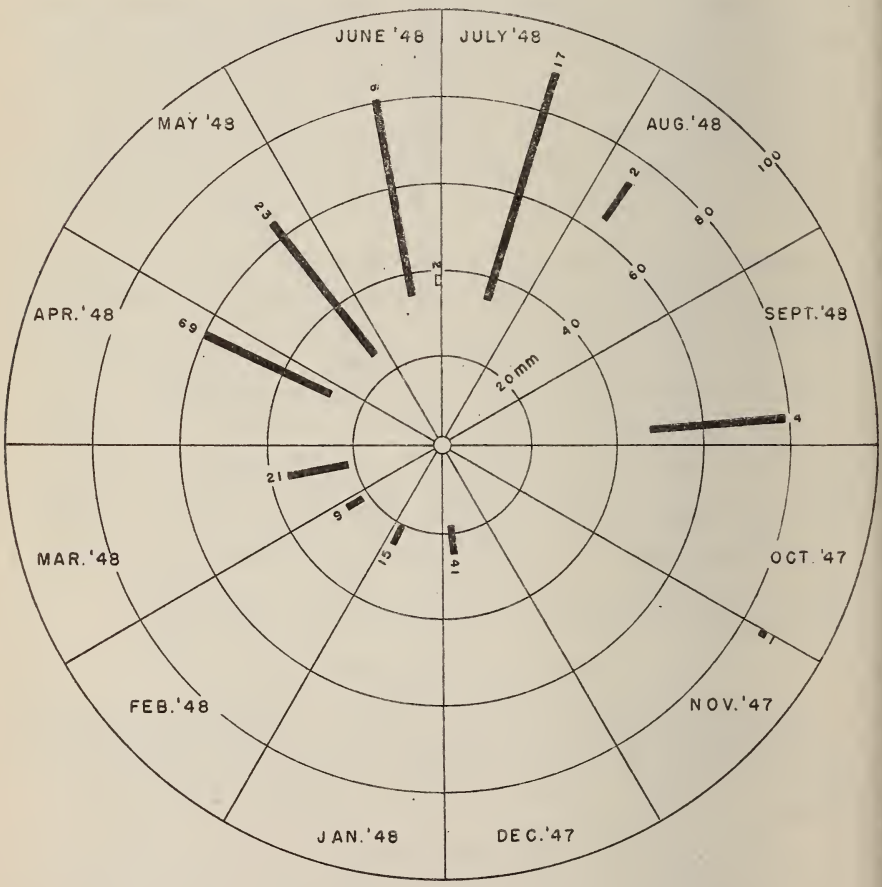

Fig. 4. Number and size range of young mullet collected from the Bayport area October, 1947–September, 1948, represented by dark, radial bars (the hollow bar represents a June, 1947, collection). Numbers at ends of bars show sizes of samples.

arranged to form a pattern over an area of about ten feet in diameter, and detonated simultaneously, should accomplish the desired effect. The dynamite can be planted with a dibble in a matter of minutes, and proper spacing of the sticks can be determined for a given marsh after a few trials. In the event blasting is used, it is suggested that it be done during the late summer when the mullet are normally in deeper water.

It is believed that the new pools should meet the following requirements:

a. The depth should not be less than twelve inches nor greater than three feet at normal low tide. Complete drainage of a pool at low tide would force the fish concentrated there to seek other waters.

b. The width should not exceed 35 feet. Larger pools may be as useful, but the data collected to date, at least, indicate a greater use of the small ones by the young fish. (In the event the blasting method is employed, it will be difficult to create pools larger than from ten to fifteen feet in diameter, but these should be adequate.)

c. The bottom should be of soft mud. This will be accomplished automatically if the pools are constructed in those portions of the marshes where the ground is basically mud rather than shell, sand, or some other component.

d. The marsh adjacent to the pool should be covered fairly regularly by high tide to a depth of at least several inches. It is not necessary that channels connect the marsh pools to permanent watercourses of the marsh.

2. In addition, the rather long breeding season noted for mullet at Cedar Key and the possibly shorter one for those at Bayport is suggestive. The present closed season (December 10–January 20) designed to coincide with the spawning period may not actually be of sufficient duration for a given locality, yet may be too long, or at the incorrect time, for others. Much useful data concerning this problem could be obtained by determining the roe development in fish caught for market.

Further study is clearly indicated for all major mullet producing areas.

Summary

A total of 2,234 specimens of young striped mullet were collected in or immediately adjacent to the coastal marshes near the towns of Bayport and Cedar Key, Florida, over a period extending from May 11,

1947, through December 19, 1948. Specimens ranged from 16 to 103 mm. in standard length.

The primary habitat in the marshes consisted of small, shallow pools having soft mud bottoms. Exclusive of an occasional individual, the young fish were not found in the marsh streams or in other waters where a noticeable current was present nor in the larger bodies of water of the marshes.

Salinities, determined by the specific gravity method, at times and places where the mullet were collected, showed a range of from 1.1 ‰ to 35.6 ‰. There was little evidence that the salinity changes, which appeared to be fairly rapid at times, had any effect on the mullet's choice of habitat in the marshes. Fresh waters adjacent to the marshes into which the young mullet could have penetrated, and which often contained adult mullet, never were observed to contain the young.

Water temperatures in the marsh pools containing young mullet showed a range of between 13°C. and 34.5°C. Water temperatures recorded showed a greater fluctuation at Cedar Key stations than did those in the Bayport area. The stabilizing effect of a rather significant volume of spring water flowing into the Bayport area coupled with the mullet's occurrence in deeper pools there are considered the main factors contributing to this difference.

Mullet at Cedar Key of 21 mm. or less in standard length appeared in collections over the period October, 1947, to May, 1948, and indicated an extended breeding season for that area. At Bayport, collections during the same period netted mullet of the 21 mm. (or less) size only in December and suggest that a much shorter season may exist there than at Cedar Key.

Growth of the young mullet appears to be comparable in both areas studied. A 17 mm. specimen in October apparently may reach a size of slightly more than 60 mm. by the following April. Present data on larger specimens are too scattered to warrant further projection of the growth rate.

During months when mullet of the 60–65 mm. size and greater were expected to be numerous, relatively few of these larger fry were present. It is assumed that the individuals reaching about 60 mm. move out of the marshes into deeper waters. Further, in July, August, and September, 1948, repeated seining in the marshes of the Cedar Key area failed to result in the finding of mullet of any size. Possibly their absence was associated with the relatively high temperatures of the marsh pool waters. Bayport pools, on the other hand, had water

Date																Totals
ar Key	1	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	
-11-47																	7
-20-47																	59[1]
- 8-47																	111
-29-47																	24[2]
-31-47																	8
-27-48																	619
-21-48																	188
-14-48																	327
-11-48	5	1	3		1		1										309
-16-48	1	2	1	1			1	1	1								188
-27-48					1		1			1				2		1	21[3]
- 5-48																	14
-19-48																	149
																	Total Cedar Key 2024
yport																	
-30-47																	2
- 2-47																	1[4]
-26-47																	41
-29-48																	15
-28-48																	9
-20-48																	21
-25-48		1															69
-22-48	1			1		1											23
-20-48	1			1								1					6[5]
-17-48			1		1		1										17[6]
- 5-48							1									1	2
-26-48					1												4[7]
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[7] 1, 79mm.